

Confirmatory factor analysis of the Way of Coping Checklist-Revised (WCCL-R) in the Asian context

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Running Head: Coping Strategies

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Abstract

Industrial employment growth has been one of the most dynamic areas of expansion in Asia; however current trends in industrialized working environments have resulted in greater employee stress. Despite research showing that cultural values affect the way people cope with stress, there is a dearth of psychometrically established tools for use in non-Western countries to measure these constructs. Studies of the "Way of Coping Checklist revision" (WCCL-R) in the West suggest that the WCCL-R has good psychometric properties, but its applicability in the East is still understudied. A confirmatory factor analysis (CFA) is used to validate the WCCL-R constructs in an Asian population. This study used 1,314 participants from Indonesia, Sri Lanka, Singapore and Thailand. An initial exploratory factor analysis revealed that original structures were not confirmed; however, a subsequent EFA and CFA showed that a 38 item, 5-factor structure model was confirmed for the four countries. The revised WCCL-R in the Asian sample was also found to have good reliability and sound construct and concurrent validity. The 38-item structure of the WCCL-R has considerable potential in future occupational stress-related research in Asian countries.

Keywords: Occupational Stress, Coping, Asian, Confirmatory Factor Analysis

Confirmatory Factor Analysis of the Revised Way of Coping Checklist (WCCL-R) in the Asian Context

Stress is an adaptive response to a situation that is perceived as challenging or threatening to a person's well-being (Elo, Ervasti, Kuosma, & Mattila, 2008). The causes of stress include any environmental conditions that place physical or emotional demand on a person (e.g. family, relationships and work). The work environment is considered a primary setting in which there is strain. The importance of understanding stress and coping in work environments cannot be ignored when faced with the consequences that occupational stress places on both individuals and organizations. A number of studies have indicated a negative relationship between stress and individuals' and organizations' performances. For example, in the United Kingdom, stress costs employers up to £1.12 billion in the form of absence due to illness and high staff turnover, while up to 90 million working days are lost annually (Vecchio, Hearn, & Southey, 1996). Additionally, in the developed countries, such as the United States, New Zealand, and the United Kingdom, work hours have been increasing (Sparks, Faragher, & Cooper, 2001), leaving individuals with less time for leisure, family, and the pursuit of personal interests. The current trend in industrialized working environments has resulted in greater expectations of individual employees to be more competitive (Goh, 2003). Employees face continuous pressure for self-improvement due to the adoption of multi-skill policies and the rapid upgrade of technology and management practices. However, the understanding of how employees in today's environment manage their work-related stress is not so clear-cut.

Industrial employment growth has been one of the most dynamic areas of expansion in rapidly industrializing countries such as Hong Kong, Republic of Korea, Taiwan, Thailand and Singapore (Perkins, 1994). Given these changes and developments in the Asian working

environment, it would be beneficial to understand the relationship between demographic characteristics, workplace stressors and coping mechanisms among Asian employees. Recent research on 4,487 male Japanese automotive industry workers (Shimazu & Kosugi, 2003) indicated that the active coping was effective in decreasing psychological distress regardless of the type of job stressor, but not all non-active coping (e.g. avoidance) contributed to decreasing psychological distress in conjunction with active coping. Likewise, Lambert, Lambert and Ito (2004) studied the relationships among work stressors, copings, and well-being among 310 Japanese nurses. They found that Japanese nurses, in this study, tended to use each of the coping mechanisms that were measured, but with specific workplace stressors. Similarly, Siu, Spector, Cooper, Lu and Yu (2002) examined the stress-strain relationship among 876 managers in the Greater China (the People's Republic of China [PRC], Hong Kong, and Taiwan). Both Hong Kong and Taiwan samples, managers who reported more frequent use of control coping (e.g. problem-focused) would report better mental and physical well-being. In the China sample, control coping was marginally and positively related to mental well-being. Surprisingly, the support coping had no direct effect on well-being in any of the three groups. These studies enhanced our understanding of stress and coping in Asian context. However, some limitations from the above studies have taken place in sample and analysis method. For instance, Shimazu and Kosugi's (2003) study was based on male respondents only. Further, none has fully tested metric and scalar invariance on their measurements. Particularly, Siu et al.'s (2002) study compared mean differences among the three groups (PRC, Hong Kong and Taiwan). From a methodological viewpoint, mean comparisons require scalar invariance or strong factorial invariance, i.e. cross-group invariance of every variable's factor loading and intercept (Meredith, 1993). Thus, the lack of appropriate test can influence the findings from previous studies.

Transactional model of stress and coping

A number of instruments have been designed to measure individual stress coping strategies including the Cybernetic Coping Scale (Edwards & Baglioni, 1993), the COPE inventory (Carver, Scheier, & Weintraub, 1989) and the Way of Coping Checklist (Lazarus & Folkman, 1984). However, the Way of Coping Checklist (WCCL) is a more widely used measure of coping, and was derived from Lazarus and Folkman's (1984) transactional model of stress.

The transactional model identifies four key components in the stress process. They are the stressor (stressful events), the environment, the person and the outcome. It is the interaction between these elements (stressor, environment and person) that brings about the experience of psychological and physiological stress. According to Lazarus and Folkman's (1984) transactional model of stress and coping, stressful events shape individuals' cognitive appraisal and coping response. There are two parts to appraisal, aptly named primary and secondary appraisal. Primary appraisal is activated at the onset of a potentially stressful encounter where the individual determines if the situation is a threat to his/her wellbeing. If the encounter is perceived as threatening, then the secondary appraisal will be activated. This is where the individual assesses his/her ability and resources available to manage the threatening encounter, which is known as a stressor. These appraisal processes influence the type of coping strategies employed, and the success of the chosen strategies will determine the level of stress eventually experienced.

The transactional perspective suggests that coping is a consequence of the interaction between the person and his/her stressful encounter, where the potentially stressful event is appraised and the decision as to how it can be managed (coping) is made afterwards. Many researchers have employed the revised version of the WCCL (Vitaliano, Russo, Carr, Maiuro, & Becker, 1985) to measure coping strategies and their relationship to psychological, physical and social well-being outcomes (e.g. Dysvik, Vinsnes, & Eikeland, 2004; Weinstein,

Healy, & Ender, 2002). The instrument has also been shown to have respectable internal consistency reliabilities as well as construct and criterion-related validity (Vitaliano et al., 1985).

Folkman and Lazrus (1980) developed a 68-item scale namely the Ways of Coping Checklist (Revised) (WCCL-R). In the original form of the WCCL-R contained two subscales of coping, i.e. problem-focused and emotional coping strategies. Vitaliano, Russo, Carr, Mauiro, and Becker (1985) improved the WCCL-R scale by administering it to a large sample of medical students ($n = 425$) and factoring the item responses. Vitaliano et al. (1985) revised this scale into 42 items and extended the emotional coping into other four categories, i.e. seeking social support, blamed self, wishful thinking and avoidance. In responding to the WCCL-R, participants rate how frequently they use each of the 42 coping responses using a four-point scale (never used to regularly used). Vitaliano et al.'s (1985) study indicated strong evidence for the construct and concurrent validity of the short version of WCCL-R. The internal consistency from the authors' study ranged from .74 to .88

Most studies exploring the factor structure of the WCCL-R (revised version) have tested its constructs through exploratory factor analyses (EFA) only (Abramovitch, Schreier, & Koren, 2000; Howells & Stewart, 2003; Latack & Havlovic, 1992). The results of studies using exploratory factor analysis should be interpreted with some caution given that it is not a hypothesis-testing procedure (Hanley, Meigs, Williams, Haffner, & D'Agostino, 2005). To confirm the WCCL-R in Asian text, this study will retest the WCCL-R constructs using CFA with an Asian sample. As CFA is a more advanced technique designed to test the underlying theoretical structure of latent processes (Tabachnick & Fidell, 1996), this is an essential step towards the validation of the WCCL-R in an Asian sample. The study will also report on the psychometric properties, reliability and validity of the WCCL-Asian, as well as noting the invariance for each country.

Coping Strategies and Stress Levels

The relationship between various coping strategies and stress has been the topic of some research in the general population. Evidence suggests that coping strategies are related to stress levels. For example, Evers, Kraaimaat, Geenen, and Bijlsma (1997) concluded that rheumatoid arthritis patients who reported high use of seeking social support as a coping strategy had lower depression, anxiety and stress during their first year after diagnosis. Yu et al. (2007) performed a meta-analysis of 477 studies investigating stress- and coping-related topics between January 1980 and December 2003 in Taiwan. They found that problem-focused coping strategies were negatively related to stress level and health. Similarly, Stahl and Caligiuri (2005) found that the use of emotion-focused coping effectively helped expatriates maintain their mental well-being. Collectively, there appears to be a relationship between coping strategies and stress level.

The WCCL-R scale has been widely used in many studies, but mainly in Western contexts. Thus, it is essential to confirm that the WCCL-R can also apply to Eastern contexts. Therefore, this study aims to explore the psychometric properties, generalizability, and applicability, of the WCCL-R scale by Vitaliano et al. (1985) for use in the Asian population.

Method

Participants

One thousand three hundred and fourteen full-time Asian employees responded to the study (Indonesians, $n = 720$; Singaporeans, $n = 100$; Sri Lankans, $n = 169$; Thais, $n = 325$). The mean age for all participants was 36.27 years ($SD = 9.13$). Of these, 56% were female and 37% were male, and 7% did not report their gender. Twenty two percent of respondents had completed education at a high school/diploma level, 47% of respondents had completed undergraduate level and 31% of respondents had completed postgraduate level or higher. The participant response rate was approximately 55%.

Measures

Demographic data. Demographic variables included age, gender, marital status, position, employment status, number of years they had worked in their firm, and highest level of education. However, the only demographic information common to all datasets was age and gender.

WCCL-R: Way of Coping Checklist (Vitaliano et al., 1985). The WCCL-R has 5 subscales: Problem-focused coping (15 items, e.g. ‘came up with a couple of different solutions to the problem’); Seek Social Support (6 items, e.g. ‘talked to someone about how I was feeling’); Blame Self (3 items, e.g. ‘criticised or lectured myself’); Wishful Thinking (8 items, e.g. ‘hoped a miracle would happen’); and Avoidance (10 items, e.g. ‘went on as if nothing had happened’). A reliability analysis revealed that the subscales had high reliability values, with Cronbach’s Alphas of 0.87 and above.

Occupational Stress. The Occupational Stress Inventory (Osipow & Spokane, 1987) measures the overall occupational stress level of respondents. The instrument assesses three interrelated overall dimensions each important in the experiencing of occupational adjustment, i.e. occupational role, personal strain and coping resources; however we used the personal strain subscale in this study. Personal strain is the subjective responses regarding four types of occupational stress symptoms: Vocational Strain (problem with attitude and work quality); Psychological Strain (expressed psychological or emotional problems); Interpersonal Strain (level of interpersonal disruption) and Physical Strain (physical illness or poor self-care). These items are scored on a five-point scale from 1 = (rarely or never) to 5 = (most of the time). Cronbach’s Alpha revealed a high reliability value of 0.92.

Procedure

The recruitment of participants involved contacting various organizations and institutions for participation and collaboration. This was done through direct contact via telephone, email, and general mail. As a substantial proportion of participants came from

different countries, the questionnaires were either mailed directly to them or to a collaborator in the country in which they were located. The collaborators in all countries received full instructions about the procedure of administering the questionnaires and data entry.

Accompanying each questionnaire was an information sheet explaining the purpose of the study, assuring anonymity, and giving instructions as to what to do with the survey when completed. A consent form was attached to the survey and informed participants that their participation was purely voluntary, and that they were free to terminate their involvement in the study at any time. Completed questionnaires were then sent back to the researchers for analysis. Sri Lankan participants were paid in the form of a free movie ticket, whereas the remaining participants were involved in the study on a voluntary basis. In essence, the method used was a convenience-sampling technique, whereby the researcher gains access to the sample via a contact in the organization. However, the return rate of the questionnaires was generally better than expected when using this method.

The translation of the questionnaire into local language is accomplished through a two-stage back-translation procedure. Bilingual volunteers with both local and western undergraduate education first translated the questionnaire from English into local languages, and then another group of bilingual volunteers back-translated the measure into English. The bilingual volunteers were categorized by their language skill, i.e. Bahasa (Indonesia), Sinhala (Sri Lanka) and Thai (Thailand). Since Singapore's official language is English, this study used the English version for the Singaporean sample. Following the translation from English into each local language, the original questionnaire was compared to the back-translated English version, and differences were resolved through discussion. The bilingual volunteers were not aware of the purpose of the study. This process was used to help ensure an accurate, literal translation of the original English language version of the questionnaire.

Results

All relevant variables of coping strategies and occupational stress were screened using SPSS 13.0. Frequencies procedures were used to test for normality, linearity, and homoscedasticity. Tabachnick and Fidell (1996) recommend that the acceptable cut-off for skewness and kurtosis for each variable should be 0.40 or less. The screening process was conducted on the datasets from all four countries. Only data from the Thai sample showed Problem Focus coping had a kurtosis above 0.40. In light of the fact that kurtosis may not be an issue for the large sample size (Tabachnick & Fidell, 2007), we decided that the variables should remain as they were.

Development of a Factor Structure of WCCL-R in the Asian context

Given the four Asian samples and the fact that the psychometric properties of an Asian sample cannot be assumed to be similar to Western samples, it was decided to use EFA to first explore the psychometric properties and then use CFA to confirm the structure. In order to achieve this, the whole sample was divided into two sub samples. Given that the Indonesian sample was relatively large, we separated the Indonesian sample into two groups. We conducted an EFA with the first half of the Indonesian sample (Group A). We then confirmed and refined the scales using the other half of the Indonesian sample (Group B). Finally, we performed a CFA and multigroup analysis with the remaining three samples (i.e. Singapore, Sri Lanka and Thailand) and the Indonesian sample in Group B.

Exploratory Factor Analysis

A principal factoring analysis with oblique rotation was used in order to allow for correlations between items on the questionnaire. Eigenvalues greater than 1 and examination of the scree plot were the methods used to establish the number of the factors to be extracted. Items were included on a factor if they displayed a loading of at least 0.4 on one the factors, unambiguously loaded on that factor, and were conceptually coherent with other items on the factor.

Initial analyses of the Asian sample (Group A) produced eight eigenvalues over 1; however, examination of the scree plot suggested a five-factor solution. Next, all 42 WCCL-R items were submitted to an EFA again, forcing the extraction of five factors (because, as noted earlier, the scree plot had levelled off at about the fifth factor). After rotation, the five-factor solution was retained preliminarily because it fit the data best, was meaningfully interpretable, and comprised all major theoretical dimensions of coping, as outlined by Vitaliano et al. (1985). The EFA was run twice again in Group B to confirm and refine the constructs, and items with factor loadings smaller than .40 or cross-loadings larger than .30 on a second factor were dropped each time, following Tabachnick and Fidell's (1996) recommendation. As shown in Table 1, the final model comprised 38 items loading on five factors and accounted for 54.06 % of the total variance.

INSERT TABLES 1 HERE

The Use of Goodness of Fit Measures as Criteria for Confirmatory Factor Analysis

In order to confirm the factor structure of the revised WCCL-Asian, AMOS 7.0 (Arbuckle, 2006) was used to perform a series of confirmatory factor analyses. In each analysis, the maximum likelihood estimation method was used. Goodness of fit measures are designed to indicate the general overall model fit with respect to the sample data and variances. In Structural Equation Modelling, there is no single or omnibus goodness of fit measure. Thus, a number of such measures are calculated and reported as each contribute different analytical information and collectively provide insight into the overall fit of the model or factor solution to the analyzed data. In line with this practice, it was decided to report the following indices: relative chi-square (CMIN/DF), goodness-of-fit index (GFI),

Bentler's comparative fit index (CFI) (Bentler, 1992), Tucker-Lewis Index (TLI) and the root mean squared error of approximation (RMSEA).

The simple fit index is called relative chi-square (CMIN/DF). The CMIN/DF is the minimum sample discrepancy divided by degrees of freedom. Values below 1.0 indicate an "overfitted" model, and values larger than 2.0, or the more moderate limit of 5.0 indicate that the model does not fit the observed data and requires improvement (Shumacker & Lomax, 1996). However, this index may be overly sensitive to sample size; therefore, other fit indices should be considered as well.

The GFI is similar to the r^2 value from a regression analysis. The CFI is a comparative index between the fit of the proposed model and a baseline model in which the observed variables are assumed to be uncorrelated with each other. The CFI value is between 0 and 1.00. GFI and CFI values exceeding 0.90 indicate a good fit of the model to the data (Byrne, 1998; Kelloway, 1998). The Tucker-Lewis Index (TLI) is comparative index between the proposed model and the null model with a measure of parsimony. TLI values exceeding 0.9 indicate a good fit of the model to the data (Byrne, 2001a) RMSEA values below 0.05 indicate a very good fit to the data; however values below .08 are also considered adequate (Steiger, 1990).

Confirmatory Factor Analysis for WCCL-R and Occupational Stress

The CFA model tested that the Asian sample data would support the five-factor structure revealed in the EFA, which was evidently identical to the original WCCL-R factor structure established by Vitaliano et al. (1985). Using Group B to perform the CFA, it was found that the model moderately fit the data [$\chi^2(652)=3373.81$; CFI=.90; TLI=.89; RMSEA=.05]. Next, the second-order CFA is performed since first-order factors are explained by an alternative higher order structure (see Byrne, 2001b). The Second-order CFA estimated the five subscales of WCCL-R as one single second-order latent factor representing

way of coping. The second-order CFA model of WCCL-R indicated an acceptable fit data [$\chi^2(648)=2825.66$; CFI=.90; TLI=.89; RMSEA=.05].

We also examined the four-factor CFA model of occupational stress, that is vocational, psychological, interpersonal, and physical strains. The priori four-factor model indicated an acceptable fit [$\chi^2(475)=1025.03$; CFI=.89; TLI=.89; RMSEA=.05]. Because the fundamental structure of five-factor model was supported in the first-order CFA, a second-order CFA (labelled as Occupational stress) was constructed. The fit of the second-order CFA indicated a good fit to the data [$\chi^2(477)=1027.67$; CFI=.90; TLI=.90; RMSEA=.04]. Table 2 summarizes the standardized regression weights and standard errors of the second-order CFA models of WCCL-R and occupational stress measures.

INSERT TABLES 2 HERE

Testing for Metric and Scalar Invariances across Nations: Indonesia, Thailand, Singapore and Sri Lanka

A multiple group analysis was used to test for group invariance across the four groups (Indonesian, Thai, Singaporean, and Sri Lankan) simultaneously in order to obtain efficient estimates and the pattern of fixed and free parameters. Given that the higher order models fit the data nearly as well as the first order models; these were used in testing for invariance among nations. To perform the metric invariance test, we set individual parameters to be equally constrained across the four samples. A comparison between unconstrained [$\chi^2(2588) = 5526.34, p < .05$] and constrained [$\chi^2(2687) = 5606.63, p < .05$] models indicated a non-significant difference [$\chi^2_{different}(99) = 83.29, ns$]. This result indicated that the full metric invariance model was applicable for our four samples.

To compare construct means or intercepts across groups, we also needed to test for the invariance of item intercepts (i.e., "scalar" invariance; Steenkamp & Baumgartner, 1998). When we constrained scalar invariance, the chi square difference was insignificant [$\chi^2_{different}$

(12)=4.09 , *ns*]. The other indices also suggested that scalar invariance is accepted (CFI=.89; TLI=.89; RMSEA=.03]

Validation of the WCCL-R in the Asian context:

Correlation coefficients (Table 3) were computed among the subscales, the total scale of coping strategies and occupational stress. Problem-focused coping and seeking social support were strongly negatively associated to occupational stress level.

INSERT TABLE 3 HERE

The use of coping can vary across nations, cultures or subcultures (Cervantes & Castro, 1985; Cortina & Wasti, 2005). Thus, it is also useful to validate if people in each specific country use different coping strategies to other nations. Thus, the multivariate analysis attempted to confirm if nation affected the use of coping strategies among samples. As shown in Table 4, individuals in the various countries were found to have significantly different scores on each subscale as well as the total score of the WCCL-Asian.

For the problem-focused coping strategy, all four countries' mean scores were significantly different from each other. Indonesia had the highest mean ($M= 4.01$, $SD = .55$), with Singapore ($M= 3.62$, $SD = .60$), Thailand ($M= 3.40$, $SD = .67$) and Sri Lanka ($M= 3.11$, $SD = .97$) following respectively.

For the seeking social support coping strategy, Thailand ($M= 2.51$, $SD = .89$) was significantly different from Sri Lanka ($M= 1.97$, $SD = .98$) and Sri Lanka was significantly different from Indonesia ($M= 2.53$, $SD = .94$).

For the blaming self coping strategy, Thailand ($M= 2.70$, $SD = .89$) was significantly different from Singapore ($M= 2.14$, $SD = .92$), Sri Lanka ($M= 1.84$, $SD = .95$) and Indonesia ($M= 2.33$, $SD = .99$). Furthermore, Singapore was significantly different from Sri Lanka.

For the wishful thinking coping strategy, Thailand ($M= 3.65$, $SD = .72$) was found to be significantly different from Singapore ($M= 3.40$, $SD = .82$) and Sri Lanka ($M= 2.92$, $SD = .98$). Moreover, Sri Lanka was significantly different from Indonesia ($M= 3.59$, $SD = .68$).

For the avoidance coping strategy, Thailand ($M= 2.44$, $SD = .70$) was significantly different from Singapore ($M= 2.14$, $SD = .75$) and Sri Lanka ($M= 1.68$, $SD = .69$). Furthermore, Singapore was significantly different from Sri Lanka and Indonesia ($M= 2.43$, $SD = .76$). Finally, Sri Lanka was found to be significantly different from Indonesia.

For total scale scores, Thailand ($M= 2.94$, $SD = .48$) was significantly different from Singapore ($M= 2.72$, $SD = .56$) and Sri Lanka ($M= 2.30$, $SD = .65$). Furthermore, Singapore was significantly different from Sri Lanka and Indonesia ($M= 2.98$, $SD = .48$). Finally, Sri Lanka was found to be significantly different from Indonesia as well.

No differences were observed between Indonesia and Thailand on Seeking Social Support, Wishful Thinking or Avoidance coping strategies. There were also no observable differences between Indonesia and Singapore on Seeking Social Support and Blame Self coping strategies. Comparing Thailand and Singapore, no differences were observed on Seeking Social Support or Avoidance.

INSERT TABLE 4 HERE

Discussion

The purpose of this study was to explore the psychometric properties, generalisability and applicability of the WCCL-R scale by Vitaliano et al. (1985) for use in the Asian population. An Exploratory Factor Analysis (EFA) revealed that a five-factor solution was the best outcome. These results supported the original five-factor structure of the scale found using a Western sample. However, the EFA results indicated four problematic items. These items had large residuals, cross-loadings or ambiguous content (e.g. “tried not to burn my

bridges behind me, but left things open somewhat”) and were subsequently removed, and a revised scale structure was established. Coincidentally, the removed items were found to have either mixed or cross-loadings between subscales from Vitaliano et al.’s (1985) original scale as well.

We validated the five-factor structure with 38 items through confirmatory factor analysis (CFA). CFA confirmed the EFA five-factor model as a good fit for the data, suggesting the soundness of the WCCL-R psychometric properties in Asian context. While the remaining items maintained the original structure of coping constructs, the revised scale alphas ($\alpha_{\text{total scale}} = .87$) were higher than the original scale ($\alpha_{\text{total scale}} = .76$), and shared substantially less variance ($\sigma^2_{\text{revised}} = .25$; $\sigma^2_{\text{original}} = .30$). All five factors correlated moderately with each other (r between .07 and .50) as well as with the total scale (r between .52 and .72). To examine cross validity, we compared the WCCL-R across four different Asian samples. The results of a multiple group analysis indicated that the measurement model was equivalent across samples from Indonesia, Singapore, Sri Lanka, and Thailand. Thus, we have demonstrated the WCCL-R is explained well in our Asian samples.

It was also demonstrated that the WCCL-R can be applied to working employees in the Asian context. We found that the way people cope with stress was different according to the age. For instance, in Thai culture, younger people are taught to play the role of an observer rather than a speaker. Thus, when junior employees face a stressful event they may choose to cope with the event more emotionally, using strategies such as self-blaming, wishful thinking or avoidance. When examining the Thai dataset in comparison to others, we found that 38% of the Thai sample was aged below 30, whereas only 32% of the Singaporeans, 30% of the Sri Lankans and 32% of the Indonesians were this age. This difference in age distribution may explain why the Thai sample reported a higher mean score on self-blaming, wishful thinking and avoidance than the other three samples. Although Singapore, Sri Lanka,

Indonesia and Thailand are all considered to be Southeast Asian countries, they have different cultures from one another. This claim was further supported by the finding of differences between each country in the coping methods selected by individuals.

The analysis of the WCCL-R in the Asian context also revealed that the use of different coping strategies was associated with occupational stress level. The findings showed that problem focused coping and seeking social support strategies had a strong negative relationship with stress level among the samples. That is, reduced stress levels were observed among participants who reported using these strategies. This finding confirms Stahl and Caligiuri's (2005) study of 116 expatriate managers, where the participants reported problem-focused coping strategies were more effective than emotion-focused coping strategies. Likewise, Yu et al.'s (2007) study concluded that seeking social support weakened the effect of stress on health. Furthermore, Chang's (2008) study revealed that most Chinese students sought out social support regardless of the types of problems they were experiencing. In line with the transactional model of stress and coping and with previous empirical research, the coping strategies identified in the WCCL-R (problem-focused and seeking social support, in particular) appear to be related to stress levels among our Asian samples.

In conclusion, the WCCL-R seems to be an appropriate measurement tool for use in Asian populations. Of course, the only way to establish this conclusively would be to conduct a replication of the WCCL-R in other Asian countries. Nevertheless, the fact remains that the WCCL-R in the Asian context exhibits the same strong properties as those from the Western version. We believe that this provides cross-cultural evidence for the reliability and validity of the WCCL-R. Furthermore, the reduced form of 38 items has good statistical properties and improved construct validity, as the EFA and CFA results indicate. Thus, this reduced form offers a good replication of the WCCL-R scale with a subsequent reduction in questionnaire completion time.

Some limitations and consequent suggestions for future research are worth noting. First, this study examined only non-clinical, working adults and it is possible that the results may not be generalizable to a non-working sample or clinical sample. Furthermore, the majority of participants (78%) had obtained an undergraduate university degree, with almost a third of the entire sample having completed postgraduate level or higher. It is possible that the coping strategies of such a highly educated sample may be inherently different to those of a sample of people with little or no formal education. As a result, it would be informative as well as necessary to administer the WCCL-R in the Asian context not only to other Asian countries, but to Asian samples with different demographic characteristics, and to attempt to confirm the factor structure and psychometric properties of the scale in these populations. Clearly, much more remains to be done with larger samples in other non-western countries to determine the true robustness of the current findings. Furthermore, self-report measurement techniques have inherent limitations. However, despite these limitations, this study increases the understanding of the psychometric properties of the WCCL within the context of Asian culture.

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Table 1
Factor loading from exploratory factor analysis (Sample A: $n = 360$)

	Communalities	Problem-focus	Seeking Social Support	Blamed self	Wishful Thinking	Avoidance
Bargained or compromised to get something positive from the situation	0.472	0.694				
Concentrated on something good that could come out of the whole thing	0.381	0.692				
Made a plan of action and followed it	0.414	0.686				
Came out of the experience better than when I went in	0.508	0.672				
Changed something so things would turn out all right	0.462	0.669				
Just took things one step at a time	0.492	0.667				
I know what had to be done, so I doubled my efforts and tried harder to make things work	0.478	0.659				
Came up with a couple of different solutions to the problem	0.473	0.656				
Changed something about myself so I could deal with the situation better	0.516	0.616				
Stood my ground and fought for what I want	0.509	0.609				
Accepted the next best thing to what I wanted	0.392	0.585				
Try not to act too hastily of follow my own hunch	0.460	0.574				
Accepted my strong feelings, but didn't let them interfere with other things too much	0.526	0.415				
Changed or grew as a person in a good way	0.494	0.401				
Talked to someone to find out about the situation	0.495		0.709			
Accepted sympathy and understanding from someone	0.624		0.672			
Asked someone I respected about how I was feeling	0.552		0.668			
Talked to someone about how I was feeling	0.463		0.621			
Got professional help and did what they recommended	0.753		0.612			
Talked to someone who could do something about the problem	0.741		0.586			
Blamed yourself	0.514			0.823		
Criticized or lectured yourself	0.495			0.818		
Realized you brought the problem yourself	0.464			0.686		
Hoped a miracle would happen	0.535				0.683	
Wished I was a stronger person--more optimistic and forceful	0.429				0.657	
Wished that I could change what had happened	0.396				0.643	
Wished I could change the way that I felt	0.585				0.606	
Wished that situation would go away or somehow be finished	0.571				0.561	
Daydreamed or imagined a better time or place than the one I was in	0.641				0.535	
Had fantasies or wishes about how things might turn out	0.604				0.512	
Went on as if nothing had happened	0.447					0.769
Slept more than usual	0.425					0.710
Got mad at the people or things that caused the problem	0.306					0.683

Coping Strategies 22

Tried to forget the whole thing	0.395					0.653
Tried to make myself feel better by eating, drinking, smoking, taking medications	0.346					0.539
Avoided being with people in general	0.491					0.523
Refused to believe it had happened	0.350					0.487
Kept others from knowing how bad things were	0.397					0.475
% Variance		23.63	14.44	5.93	5.45	4.61
Composite Reliability (Total scales = 0.87)		0.87	0.79	0.80	0.77	0.75

Table 2

A summary of the standardized regression weights and standard errors of the second-order CFA models of WCCL-R and occupational stress measures.

Factors		Standardized Regression Weights	Standard Error
Way of Coping Checklist	Problem-focus	.430	.023
	Seeking social support	.810	.023
	Blamed self	.566	.031
	Wishful thinking	.853	.032
	Avoidance	.443	.043
Occupational stress	Vocational strain	.903	.043
	Psychological strain	.719	.020
	Interpersonal strain	.979	.011
	Physical strain	.905	.009

Table 3

Correlations between coping scales and occupational stress (Sample C: N = 914)

	1	2	3	4	5	6	7
1.Problem-focus	(0.88)	0.13**	0.07**	0.52**	0.14**	0.52**	-0.14**
2.Seekig social support		(0.78)	0.35**	0.26**	0.50*	0.72**	-0.12**
3.Blamed self			(0.81)	0.22**	0.40**	0.67**	-0.02*
4.Wishful thinking				(0.79)	0.25**	0.65**	-0.02*
5.Avoidance					(0.74)	0.70**	-0.06*
6.Total scale						(0.87)	-0.08**
7.Occupational stress							(0.92)

** . Correlation is significant at the 0.01 level (Cronbach's Alpha)

Table 4

National differences on subscales and total score on the WCCL-R in the Asian sample

WCCL-R Asian version	COUNTRY	Mean	S.D.	F(df)	National differences
Problem-Focus	Thailand (TH)	3.40	0.67	122.18(3)	TH-SI*, TH-SR*, TH-IN*, SI-SR*, SI-IN*, SR-IN*
	Singapore (SI)	3.62	0.60		
	Sri Lanka (SR)	3.11	0.97		
	Indonesia (IN)	4.01	0.55		
Seeking Social Support	Thailand (TH)	2.51	0.89	18.05(3)	TH-SR*, SR-IN*
	Singapore (SI)	2.29	1.02		
	Sri Lanka (SR)	1.97	0.98		
	Indonesia (IN)	2.53	0.94		
Blamed Self	Thailand (TH)	2.70	0.89	32.73(3)	TH-SI*, TH-SR*, TH-IN*, SI-SR*
	Singapore (SI)	2.14	0.92		
	Sri Lanka (SR)	1.84	0.95		
	Indonesia (IN)	2.33	0.99		
Wishful Thinking	Thailand (TH)	3.65	0.72	42.00(3)	TH-SI*, TH-SR*, SR-IN*
	Singapore (SI)	3.40	0.82		
	Sri Lanka (SR)	2.92	0.98		
	Indonesia (IN)	3.59	0.68		
Avoidance	Thailand (TH)	2.44	0.70	52.44(3)	TH-SI*, TH-SR*, SI-SR*, SI-IN*, SR-IN*
	Singapore (SI)	2.14	0.75		
	Sri Lanka (SR)	1.68	0.69		
	Indonesia (IN)	2.43	0.76		
Total Scale	Thailand (TH)	2.94	0.48	85.10(3)	TH-SI*, TH-SR*, SI-SR*, SI-IN*, SR-IN*
	Singapore (SI)	2.72	0.56		
	Sri Lanka (SR)	2.30	0.65		
	Indonesia (IN)	2.98	0.48		

* $p < .05$